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1 UNITED STATES DISTRICT COURT
2 SOUTHERN DISTRICT OF NEW YORK

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3 SECURITIES AND EXCHANGE
4 COMMISSION,

Plaintiff,

v.

23 Civ. 1346 (JSR)

6 TERRAFORM LABS PTE LTD., ET
7 AL.,

Hearing

8 Defendants.

9 -----x

10 New York, N.Y.
11 November 17, 2023
12 2:00 p.m.

Before:

13 HON. JED S. RAKOFF,

14 District Judge

15 APPEARANCES

16 U.S. SECURITIES AND EXCHANGE COMMISSION

Attorneys for Plaintiff

17 BY: CHRISTOPHER J. CARNEY

JAMES P. CONNOR

18 LAURA E. MEEHAN

19 DENTONS US LLP

Attorneys for Defendants Do Hyeong Kwon and Terraform Labs

20 BY: DOUGLAS W. HENKIN

LOUIS A. PELLEGRINO, III

21 MARK CALIFANO

MATTHEW A. LAFFERMAN

22 DAVID L. KORNBLAU

23 Also Present:

24 Elliott Bacon, Katten Muchin Rosenman

25 Sarah Gonzalez, Paralegal

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(Case called)

THE DEPUTY CLERK: Will the parties please identify themselves for the record.

MR. CARNEY: Good afternoon, your Honor.

Christopher Carney for the SEC.

MR. CONNOR: Good afternoon, your Honor.

James Connor for the SEC.

MS. MEEHAN: Good afternoon.

Laura Meehan for the SEC.

MR. HENKIN: Good afternoon, your Honor.

Douglas Henkin for the defendants.

MR. PELLEGRINO: Good afternoon, your Honor.

Lewis Pellegrino for the defendants.

MR. CALIFANO: Good afternoon, your Honor.

Mark Califano for the defendants.

MR. LAFFERMAN: Good afternoon.

Matthew Lafferman for the defendants.

THE COURT: So there is someone there who didn't introducer herself.

MR. KORNBLAU: David Kornblau for the defendants.

MS. GONZALEZ: Sarah Gonzalez, paralegal.

THE COURT: You're the most important person here.

Welcome, everyone. As you can see, this is a jury hearing. We have a very distinguished group of jurors whose part-time job is that they are students in my seminar at

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1 Columbia Law School, and they heard the lawyers here were so
2 terrific, it's worth coming to see, so put on a good show.

3 I know that the SEC had asked to postpone this hearing
4 because one of their attorneys was sick, and please extend to
5 him my great sympathy. And I don't know how the SEC can manage
6 to survive with only three attorneys here to argue, but I guess
7 they'll do as best they can. But the reason I denied that
8 request, among other things, was because defense counsel had
9 said their experts were only available today. So I think we
10 ought to start with the defense experts and make sure we at
11 least finish with them today.

12 MR. CARNEY: Your Honor, I'm Chris Carney.

13 THE COURT: Oh, you are the --

14 MR. CARNEY: I was the recovering sick person.

15 THE COURT: Well, congratulations on your miraculous
16 recovery.

17 MR. CARNEY: 36 hours of sleep has markedly improved
18 my well-being.

19 THE COURT: Just don't get too close to the bench.

20 MR. CARNEY: I will not. Thank you, your Honor.

21 THE COURT: Okay. So sort of what I'd like to do is,
22 as we get to each expert, because all five experts have been
23 objected to on Daubert grounds, first, hear from counsel and
24 then, if necessary, we'll hear from the expert themselves.

25 So let's start with Dr. Christine Parlour. So should

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1 note that Dr. Parlour teaches at University of California
2 Berkeley, and I should note for the record that I teach a
3 one-week course at Berkeley Law School every spring, but I have
4 not had the pleasure of meeting Dr. Parlour. And I don't see
5 any reason to recuse myself, even under the much more demanding
6 standards that apply to federal district judges, as opposed to
7 the Supreme Court of the United States.

8 MR. HENKIN: Agreed, your Honor.

9 THE COURT: So in any event, my questions for defense
10 counsel are that she was asked by you to opine on two things:
11 First – and this is at page 3 of her report – to provide an
12 overview of the characteristics and underlying economics of
13 certain tokens on the Terra blockchain; and, second, to discuss
14 "whether risks such as the risk of a depeg with respect to the
15 Terra USD stable coin have been discussed by TFL regulators and
16 other market participants."

17 And I'm just wondering what is the expertise that
18 she's bringing to bear with respect to those? The second one,
19 as near as I can tell, consists of her noting that some people
20 had already written articles or made statements about how this
21 kind of market in cryptocurrency was inherently risky and so
22 forth. What she says at the very end of her discussion on the
23 second point on page 32 "as demonstrated above, many in
24 academia had expounded on the inherent possibility of a run
25 based on the structural design of an algorithmic stable coin,

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1 leaving it perennially subject to runs, notwithstanding reserve
2 funds that may delay or lessen the risk. The 2022 depeg was,
3 therefore, not a wholly unanticipated event."

4 Well, putting aside the joke that I would never make
5 about reading stuff from academics, why is the subject of any
6 expert testimony let alone hers?

7 MR. HENKIN: Your Honor, just would you like me to go
8 from the podium?

9 THE COURT: No. You can stay where you are.

10 MR. HENKIN: The answer --

11 THE COURT: You can be seated if you prefer.

12 MR. HENKIN: Thank you, your Honor.

13 The answer to those questions is, I think, you look at
14 this almost like some academic survey articles, and so the
15 sorts of things that Professor Parlour discusses in her report
16 are not significantly different, except for the specific
17 platforms and protocoling, of course, than what she teaches in
18 her MBA-level class at Berkeley.

19 So what she's doing is she's providing context for a
20 trier of fact to understand how DeFi platforms and technologies
21 operate and explain how they're alike but also unlike
22 traditional finance systems and products. So that's really the
23 first part of the reports, so that's the answer to your first
24 question.

25 And in that context, she worked the same --

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1 THE COURT: Just pausing on the first part, I thought
2 she said in her deposition that what she was opining on was
3 what your client was designed to do, and she had no opinion as
4 to what it actually did, so who cares?

5 MR. HENKIN: Well, the issue with what it was designed
6 to do has to do with where the burden of proof lies. And in
7 that context, what Professor Parlour is doing is explaining
8 what the SEC needs to prove did or didn't happen. So the
9 context of that is relevant to understand on the one hand how
10 these fit into what we'll eventually get to at another time in
11 terms of how to characterize the instruments, but it will also
12 help a trier of fact understand, to the extent necessary, where
13 everything fits into all of the things on which the SEC bears
14 the burden of proof including are these securities? Was there
15 fraud? Did the operation deviate from the design? And
16 remember, the defendants don't bear the burden of proof on
17 that; the SEC does.

18 THE COURT: On the issue whether or not these are
19 securities, is an issue that no one has any strong feelings
20 about, I'm sure. While the jury may have to find the facts
21 relevant to that, isn't the ultimate determination of that a
22 legal determination?

23 MR. HENKIN: I think that depends on who you ask, your
24 Honor. Certainly, the way we have argued it, you can decide it
25 as a matter of law. And if you decide it as a matter of law,

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1 then that is something that you would never need to hear from
2 Professor Parlour on. But the SEC's views, I think, are – and
3 I don't want to speak for them, but I think the SEC's views are
4 that that is an issue of fact, and under those circumstances,
5 then, Professor Parlour's views would definitely be valuable.

6 THE COURT: Well, what I'm trying to distinguish – and
7 I want to hear from the SEC in a minute – is if there are
8 disputed facts, that that's for the jury to determine, but what
9 follows from that in terms of the law is not. Sometimes it's
10 for the jury, but often it's for the judge.

11 Do you disagree with that?

12 MR. HENKIN: There's only been one case where that has
13 happened where that has been an issue. That was in the *LBRY*
14 case in the District of Connecticut that I'm aware of. And in
15 that circumstance, the jury actually made the decision.

16 THE COURT: Well, they're so smart up there in
17 Connecticut. All right.

18 What about the second part of Dr. Parlour's report?

19 MR. HENKIN: So the second part is, again, that's
20 where we come to what academics – I, like you, will not make
21 the joke – that academics refer to as survey articles. And so
22 long as the same rigor was applied to surveying the literature
23 under the circumstances, I think it's permissible for a witness
24 to give that sort of a summary of what's available. And I will
25 note that there really hasn't been any challenge by the SEC to

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1 what Professor Parlour described in that portion of her report.
2 Now, they disagree with what the implications of it should be
3 or what inferences should be drawn from it, but that's not the
4 same as disagreeing that it is not an appropriate subject for
5 an exposition in this way.

6 THE COURT: Okay. Let me hear from the SEC.

7 MR. CONNOR: Your Honor, I think your Honor hit on the
8 point correctly. Professor Parlour's opinions here in this
9 case are not opinions at all. They're merely factual
10 narratives that should be presented through percipient fact
11 witnesses.

12 Second, and relatedly, Professor Parlour offers no
13 methodology whatsoever in her report. It's just simply based
14 on her experience. And third, she failed to consider
15 sufficient facts or data to form her opinions. She did not
16 review a single deposition transcript. She did not talk to a
17 single Terraform employee. She did not review a single
18 internal Terraform document. She merely accepted as true all
19 of Terraform's marketing materials and parrots them in the
20 guise of expert testimony. That is completely improper under
21 all the cases we've cited in our briefs, none of which
22 defendants attempted to distinguish in their opposition brief.
23 I think it's going to be very confusing --

24 THE COURT: Let me ask you this. This doesn't relate
25 to her report, but just while I'm thinking about it, do we not

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1 want to have someone explain to the jury what a token is? What
2 a blockchain is, all these terms?

3 Now, normally, in these situations, that's done by
4 stipulation among the parties, and then I can just read the
5 stipulation to the jury at the outset so they know a little bit
6 about what the case is about, and I encourage the parties to do
7 that here. But otherwise, assuming for whatever reason the
8 parties are unwilling to do that – and I don't think it's a
9 question of law what is a token, what is a blockchain and so
10 forth – don't we need someone to tell the jury what that's all
11 about just so they have a sort of basic grounding?

12 MR. CONNOR: Your Honor, I think the appropriate way
13 to do that is through the fact witnesses, through the witnesses
14 who actually work with this technology. In this case, this is
15 about the Terra blockchain. And we anticipate calling
16 witnesses from Terra to explain what the blockchain actually
17 did, not how it was designed to do.

18 And I think what's problematic about her opinions is,
19 if I could just use one example with UST, she opines in her
20 opinion that "primary use case," that's the word she uses – of
21 UST is as a "medium of change like fiat currency, like the U.S.
22 dollar." When asked in her deposition if she could recount a
23 single instance of UST ever being used as a medium of change,
24 she said no.

25 Then the real primary use case of UST, as we've

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1 established in our summary judgment papers, was to deposit in
2 the Anchor Protocol, to earn interest and as an investment that
3 they marketed to retail investors. That was the primary use
4 case of UST. And so I think it's going to be very confusing to
5 a jury to have a professor come up and say, "Well, the primary
6 use as designed was this," when the facts completely do not
7 bear that out.

8 And the second, I think, misleading part of Professor
9 Parlour's report is her talking about decentralization. She
10 goes on and on in her report about how Terra blockchain was
11 decentralized, how the Mirror Protocol was decentralized. But
12 when pressed at her deposition, she admitted that she actually
13 doesn't know if it was decentralized. All she knows is how it
14 was designed, how Terraform marketed it to investors. And when
15 I put the question to her in her deposition very directly, the
16 quote is "Do you know whether the Mirror Protocol is
17 decentralized?" Her answer was "I don't know." And then
18 followed up with similar questions on Anchor Protocol, "I don't
19 know." On the Terra blockchain generally, "I don't know."

20 She really is not offering any opinions that are at
21 all relevant to this case. And on top of that, she didn't
22 consider sufficient facts or data. She didn't talk to any
23 Terraform witnesses. She didn't look at any internal Terraform
24 documents. She didn't even talk to counsel for defendants till
25 after she issued her expert report, so she couldn't even obtain

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1 documents, even if she had wanted to. So I think there are
2 just fundamental problems with her opinion.

3 THE COURT: Let me hear some rebuttal from defense
4 counsel.

5 MR. HENKIN: Thank you, your Honor.

6 Let me address the last part first. There was a
7 memory error during the deposition. In fact, there were
8 discussions prior to the issuance of Professor Parlour's
9 report. She just didn't remember in the midst of the
10 deposition. That's something that can be cleared up fairly
11 easily, so this is not a situation where there was either a
12 request for documents that went unheeded or a request for
13 documents that was not able to be made.

14 But I want to follow up on the internal documents
15 concept and talking to people concept. And this is a situation
16 where the new nature of DeFi protocols is important and where
17 Professor Parlour can provide very important context exactly as
18 your Honor was saying. Who's going to explain these issues to
19 a trier of fact? Remember that TFL is a software company, and
20 it's an open source software company, which means that
21 "internal documents," the way you would think about a company --
22 I'm just going to pick on IBM for no reason, it popped into my
23 head -- where they have internal documents that are
24 confidential --

25 THE COURT: This is a function of age. When I was a

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1 young lawyer, the hypo would always be about General Motors.
2 Then they sort of lost it. Then it was, at your age, IBM. We
3 won't comment as to where they are now in the hierarchy. Today
4 would have to be Google. But anyway, go ahead.

5 MR. HENKIN: That's exactly the point.

6 But the larger issue is that when you're dealing with
7 an open source software company that publishes all of its
8 design specifications as whitepapers and whose code is
9 available in public GitHub repositories, the concept of an
10 internal document is not the same as it is with whichever
11 company we might pick on under those circumstances. And so
12 that's the sort of thing that in and of itself is useful to
13 explain to a trier of fact as to why a lot of the things – and
14 I won't get into some of the detail because I don't think this
15 is the right time and I'm mindful of timing – but a lot of the
16 things that were being discussed are things that are
17 cross-examination questions. Did you consider this? Did you
18 consider that? Would your opinion be different if you saw – I
19 don't know – an email, for example, that the SEC would think
20 contradicts something that's in a GitHub repository? Those are
21 all cross-examination questions, but what they don't do is
22 address the fundamental question that your Honor raised is
23 wouldn't it be nice if there was somebody who could kind of set
24 the stage.

25 THE COURT: All right. Mindful, as you point out, of

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1 our time constraints, I only have a few questions for
2 Dr. Parlour. But if she's here, let's get her up on the stand.

3 MR. HENKIN: She is, your Honor.

4 CHRISTINE PARLOUR,

5 called as a witness by the Defendants,

6 having been duly sworn, testified as follows:

7 DIRECT EXAMINATION

8 BY THE COURT:

9 THE COURT: Dr. Parlour, thank you for being here and
10 thank you for bringing a touch of California weather to
11 New York.

12 I was a little concerned, if I understood what you
13 said at your deposition, about your description of the
14 methodology you had used for the two parts of your report. For
15 example, as to the second part about this information being out
16 there and so forth, your counsel, which are defense counsel,
17 was just saying, well, typically there are academic surveys,
18 yes, they are, but they are usually followed by fairly precise
19 survey criteria. And I was not clear what methodology you used
20 for either part of your report, so if you wanted to elaborate
21 on that.

22 THE WITNESS: Sure. So you know we have this long
23 history of literature that basically talks about
24 microeconomics, incentives, how markets works, understanding
25 the relationship between markets. And so what I did was I

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Parlour - Direct

1 basically took that long literature, and then I put the facts
2 that we know about this new type of business model into that
3 literature just so that it sort of makes sense from an
4 economics and finance point of view. And I did the same in
5 both sections of my report.

6 THE COURT: So this was basically you put in search
7 terms?

8 THE WITNESS: No.

9 So I have a conceptual framework that comes from
10 training, and then I put what we know about how these systems
11 were designed into that conceptual framework. So it's the same
12 thing we do in an academic model, though if I was writing an
13 academic paper, I'd have a lot of math. But in this case, what
14 I did --

15 THE COURT: Always like to have a lot of math. That's
16 absolutely *sine qua non*.

17 THE WITNESS: I described in words what basically the
18 math would have elaborated.

19 THE COURT: Okay. And am I right that, again, in the
20 second part of your report, you did not consider statements
21 made by Terraform that the risk that might otherwise be present
22 in a cryptocurrency context would not be present here? Am I
23 right you did not address what they had said on the subject?

24 THE WITNESS: I don't have my report right in front of
25 me, but I think I did mention some of the comments that they

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Parlour - Direct

1 had made. And basically, what I did is I just put into context
2 the idea that if you have a pegged asset – I think you're
3 talking about UST – if you have a pegged asset, it's
4 potentially subject to depegging.

5 THE COURT: Well, you're right. What I have from your
6 deposition is that you knew about the statements that Terraform
7 had made but did not mention in particular a "whitepaper" in
8 which Terraform downplayed the risk because you didn't think it
9 was relevant. And according to my notes, that's your
10 deposition at page 201, line 22, to 202, line 10.

11 Why is it not relevant?

12 THE WITNESS: So the point that I'm making is that
13 pegged assets, be they banks, be they currencies in the sort of
14 traditional sense, all of these have the capacity to be
15 depegged. So at the time, I was just pointing out that there
16 is a huge amount of literature, if you think about banking and
17 currencies, one. Two, I knew that there was a discussion about
18 the possibility of stable coins being depegged. And the paper
19 that you're referring to by Di Maggio and colleagues basically
20 was in that same thing, it was people talking about the
21 possibility of depeg. And in that particular paper, what they
22 did is they just did simulations.

23 THE COURT: Maybe I'm missing your point, but this is
24 ultimately a case alleging fraud. And so if, in general,
25 people are told, you know, automobile tires may go flat, and so

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Parlour - Direct

1 everyone buying an automobile knows that there's a risk that
2 the tires may go flat. But the makers of tire X says not ours,
3 we're using a new design and there's no way our tire will go
4 flat. And assume for my hypothetical that that's a lie, and lo
5 and behold, lots of tires go flat and the market for those
6 tires goes south.

7 What is the relevance of the fact, then, that people
8 were told about other tires, that they have the risk of flats
9 when the specifics, the relevant statement here was that the
10 statement of the hypothetical tire manufacturer that our tires
11 never go flat? It's the best analogy I can come up on two
12 seconds. I thought of IBM, but couldn't come up with them.

13 THE WITNESS: GM, yes.

14 THE COURT: But isn't it highly relevant to you, the
15 point you're making that Terraform was denying the risk that
16 otherwise were being complained about in academic literature?

17 THE WITNESS: So the specific paper that we were
18 talking about, the Di Maggio paper, basically this was an
19 abstruse academic paper, I would say, that did simulations
20 under certain sorts of stress tests, so it wasn't a general
21 statement. It just said -- it makes conditional statements,
22 conditional on this set of environments. We think that there
23 won't be a depeg, which is different than an advertiser making
24 statements, if I understood your analogy correctly. I don't
25 drive, so --

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Parlour - Direct

1 THE COURT: Well, you're definitely in the right city
2 now.

3 Okay. Those were all the questions I have, so you may
4 step down. Thank you very much.

5 THE WITNESS: Thank you.

6 (Witness excused)

7 THE COURT: I should mention that I'm not going to
8 make any rulings from the bench, but I will get you, as to all
9 these witnesses and the challenges, a bottom line decision by
10 Thanksgiving. The reason I want to do it by then is because
11 you have your argument for summary judgment coming up on the
12 30th, if I recall correctly, so you'll need to know that before
13 that argument.

14 Okay. Again, I'm just artificially going first with
15 the defense experts, only because of their travel issues. So
16 Mr. Raj Unny, I hope I'm pronouncing that right, who is really
17 a rebuttal expert, as I understand it, to Dr. Edman, but we'll
18 get to him in a short while. But obviously, if I agree with
19 the defense that Dr. Edman's testimony should go out, then this
20 would become irrelevant, but let's assume that that's not the
21 case.

22 Some of Mr. Unny's statements, not all, but many of
23 them have to do with opining on Dr. Edman's conclusions about
24 blockchains. But for example, Mr. Unny concludes, "Dr. Edman
25 provides insufficient evidence to substantiate his claims and

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1 opinions that the purported Chai transactions on the Terra
2 blockchain do not represent the actual processing and
3 settlement of real world Chai transactions." And my question
4 with respect to Mr. Unny is what is his expertise that allows
5 him to be an expert on blockchains?

6 MR. CALIFANO: Thank you, your Honor.

7 Mr. Unny has been working for the last ten years on
8 blockchain applications. That is part of what his business
9 does. Included in the types of things he works on are some of
10 the very functionality that we're examining here in Dr. Edman's
11 opinion, which is the use of blockchain technology and
12 blockchain transactions with traditional payment systems.

13 And Mr. Unny has been working on a number of different
14 types of blockchain applications, including a
15 blockchain-operated payment system that operated in
16 Switzerland. He also helped build and test and put into
17 operation for a brief time a tokenized system that also used
18 blockchain transactions. He also created for a bank, a
19 traditional financial services institution, the ability for the
20 bank to allow its customers to accept cryptocurrencies and
21 onboard them into their controlled accounts.

22 THE COURT: Well, again, my understanding from the
23 deposition is that he did not personally analyze the Terra
24 blockchain data in this case, that that analysis was performed
25 by employees of a firm called Cornerstone Research whose his

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1 qualifications he did not know. And at least at his deposition
2 he could not even recall which computer program the Cornerstone
3 analyst used. So where is he exercising his expertise and how
4 can I possibly determine whether it's reliable under Rule 702
5 when it was done by someone else?

6 MR. CALIFANO: Mr. Unny instructed and directed each
7 of those staff members on how they were to process the
8 blockchain data, what they were to do with the data, and he
9 personally reviewed both their work and the output. So it is
10 not accurate to say that Mr. Unny did not oversee every aspect
11 of that operation and every aspect of their work, as often
12 doctors and professors do when they're overseeing lab testing,
13 chemical testing, even lab tests for a diagnosis for a patient
14 as an expert.

15 THE COURT: Well, if what you're suggesting was a
16 hands-on supervision, how come he didn't even know what
17 computer program they used?

18 MR. CALIFANO: I think, your Honor, he would be able
19 and comfortable with describing to you exactly what was done
20 and how they did it, including a little more about the types of
21 computer language and programming that were done. I understand
22 that in that particular section of the deposition, he didn't
23 provide that specific program, but I am confident that if your
24 Honor wishes to query Mr. Unny about this, he is in a position
25 to answer your questions.

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1 THE COURT: All right. Well, we'll certainly want to
2 get him on the stand in a minute. Let me hear first from the
3 SEC.

4 MR. CARNEY: Thank you, your Honor.

5 Your Honor, as you pointed out, the SEC's expert,
6 Dr. Edman, relied on sophisticated blockchain analysis to offer
7 the opinions that he did in this case. And his ability to do
8 that derives from his training both as a Ph.D. computer
9 scientist and the fact that's what his company does. His
10 company, NAXO, specializes in that type of work.

11 Mr. Unny, on the other hand, at his deposition
12 candidly admitted that he did not hold himself out as an expert
13 on blockchain analysis, and that is not in fact what his
14 company does. Mr. Unny has no professional certifications
15 related to blockchain analysis. When asked what kinds of tools
16 he uses to perform blockchain analysis, he made reference to
17 the publically available ones that the Ethereum Foundation
18 makes available, which is a reference to Etherscan, which is a
19 public website that even I can use, and I will admit I am no
20 blockchain expert.

21 In terms of even at parts disclaimed that he had done
22 any kind of blockchain analysis, even though his report
23 identifies an important set of transfers that were shown on the
24 Terra blockchain and even though that was a large part of what
25 Dr. Edman did, he was analyzing these blockchain transfers and

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1 identifying where they came from. And that's what allowed
2 Dr. Edman to come up with the opinion that this was all one big
3 circular operation where transfers were just going in and out
4 in this closed loop to make it look like a lot of activity was
5 happening on the blockchain, but it all started and began with
6 Terraform.

7 As your Honor mentioned, he didn't really know the
8 background or qualifications of the folks at Cornerstone, even
9 the person that did most of the blockchain analysis, he
10 couldn't recall his last name. And one thing, in terms of what
11 counsel just told us now, that Mr. Unny oversaw and supervised
12 the work of Cornerstone, it's not clear to us how that could
13 have been possible. Maybe that's something that Mr. Unny could
14 clear up when he speaks with your Honor, because our
15 understanding is that the actual data, the blockchain data that
16 Cornerstone was analyzing was not in Switzerland where Mr. Unny
17 is, was not available to him in Switzerland. So what Mr. Unny
18 would have been reviewing in that case are just the reports
19 that Cornerstone themselves generated, and he wouldn't have had
20 a way to go into the blockchain data or in the SQL database
21 that Cornerstone created and query that data himself.

22 THE COURT: All right. I think maybe we should get
23 Mr. Unny on the stand since both of the speakers in effect
24 suggested that. So Mr. Unny, come on up.

25 RAJ UNNY,

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Unny - Direct

1 called as a witness by the Defendants,

2 having been duly sworn, testified as follows:

3 DIRECT EXAMINATION

4 BY THE COURT:

5 THE COURT: So again, thank you for being here.

6 I'm sure it's somewhere in your report -- it was in all
7 the other reports, but I may have missed it somehow. How much
8 are you being compensated for your expert work here?

9 THE WITNESS: Yes, your Honor.

10 As stated, in my first report, it's -- the
11 compensation is \$950.

12 THE COURT: Oh, there it is. I now see it, \$950 an
13 hour. Okay. Are you aware that some of the experts are
14 getting even more and do you want a raise? You don't have to
15 answer that.

16 So you heard the colloquy, and I guess one of the
17 questions is, since you weren't personally doing the underlying
18 processing of the data, what kind of supervision did you
19 exercise and how did you exercise it?

20 THE WITNESS: Yes, your Honor.

21 So Cornerstone research is a data analytics company,
22 and the data was provided to us with Mr. Edman's report and it
23 was in a format called JSON. And so I had Cornerstone extract
24 the data from the JSON data set and put it into a standardized
25 SQL database. And then --

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Unny - Direct

1 THE COURT: What kind of data are we talking about?

2 THE WITNESS: There is the data that Mr. Edman was
3 given by some consultant. He's not named, the consultant, but
4 it was the data that was extracted, as I understand it, from
5 Terra blockchain.

6 THE COURT: But that's part of my question. I
7 understand what you just said, whether this was all the data,
8 partial data, whether it was extracted through proper
9 methodology or from skewed methodology, you just took it as
10 given to you, yes?

11 THE WITNESS: I did verify the scripts that Dr. Edman
12 provided in terms of how they extracted it. And there is a
13 service called Terra Finder where you can query the Terra
14 blockchain directly, and I did run a few queries to make sure
15 the data was matching after we extracted it to the SQL
16 database.

17 THE COURT: Now, did you limit yourself to Dr. Edman's
18 data?

19 THE WITNESS: I tried to, your Honor, because that's
20 the data that he uses to make his opinions.

21 THE COURT: And you concluded that it wasn't
22 sufficient to substantiate his opinions; do I have that right?

23 THE WITNESS: Correct.

24 THE COURT: And so you're not saying his opinions are
25 necessarily wrong, you're saying that you can't tell whether

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Unny - Direct

1 they're right or wrong based on the evidence he examined? Do I
2 have that right?

3 THE WITNESS: No, your Honor.

4 I would say that I think the conclusions that he draws
5 are wrong, given that this is more than just blockchain data,
6 given that you also need to examine the code across the Terra
7 Chai payment system. And in the absence of the Chai data and
8 the Chai logs and the Chai code, he could not draw the
9 conclusions that he draws.

10 THE COURT: And what is the area of your expertise
11 that allows you to say that?

12 THE WITNESS: The fact that I can read the code and I
13 have looked at the same body of code and data that Dr. Edman
14 has provided, and I see all of the missing pieces that would
15 not let me make the same conclusions.

16 THE COURT: Okay. I have no further questions for
17 Mr. Unny, so thank you very much. You may step down.

18 (Witness excused)

19 THE COURT: Let's turn next to Dr. Hendershott. And
20 by the way, there was in this part of the briefing, one of the
21 issues was whether or not a company that was allegedly involved
22 in restoring UST's peg in May 2021, that the name of this
23 company should be kept confidential. Why?

24 MR. HENKIN: Your Honor, I was actually going to raise
25 that as a housekeeping question. My understanding is that that

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1 company has made the confidentiality designation. That was my
2 understanding when we took Professor Mizrach's deposition.
3 It's not a designation that's been made by the defendants or I
4 think -- and I'll let the SEC speak for itself -- or by the SEC.
5 And so we've been going on the basis of that --

6 THE COURT: So the company is not applying to this
7 Court, directed you folks to keep their name out of it? Do I
8 have that right?

9 MR. CARNEY: If I could explain.

10 So in response to the SEC's subpoena, the company
11 provided terabytes of their trading data to the SEC, which we
12 then in turn produced to defendant. So a lot of Professor
13 Mizrach's opinions and, by virtue of that, Professor
14 Hendershott's opinions are inextricably linked to that data, so
15 it's more than just their name. It's just all the references
16 to the numbers and to profits and things like that that are
17 tied to the name itself.

18 THE COURT: So I'll come back. So there's a
19 protective order in this case signed by me.

20 MR. CARNEY: Yes.

21 THE COURT: Signed by both of you.

22 MR. CARNEY: Yes.

23 THE COURT: It says nothing about a third party
24 designating confidentiality, but, of course, they could have
25 applied to this Court for such a ruling, but they chose not to.

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1 In addition, the protective order says that this Court
2 reserves unfettered discretion to not impose confidentiality as
3 to anything that's relevant to any motion before this Court.
4 So I'm about 30 seconds away from using their name, but if you
5 have some major reason for saying I shouldn't, I will consider
6 it.

7 MR. CARNEY: We --

8 MR. CONNOR: No objection.

9 MR. CARNEY: We don't have a major reason. I believe
10 their counsel might be in court.

11 THE COURT: Is their counsel here? Give your name and
12 identify your company as X.

13 MR. BACON: Yes, your Honor.

14 Elliott Bacon, Katten Muchin, on behalf of X.

15 THE COURT: So am I right you never applied to me for
16 confidentiality?

17 MR. BACON: That's correct, your Honor.

18 THE COURT: And you know that the confidentiality
19 order in place gives me unfettered discretion not to abide by
20 what the parties think should be confidential?

21 MR. BACON: Yes, your Honor.

22 THE COURT: So why the heck should I keep this name
23 out?

24 MR. BACON: Your Honor, I think that there's
25 significant amounts of materials that -- aside from the name --

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1 that are highly confidential materials.

2 THE COURT: Well, that might or might not come up, but
3 for today's argument purposes, all I propose to use is the name
4 of the company.

5 MR. BACON: Yes, your Honor.

6 THE COURT: Any problem with that?

7 MR. BACON: Your Honor, I'll submit that we believe
8 that the materials themselves are highly confidential, but I
9 understand that your Honor has unfettered access.

10 THE COURT: Well, that doesn't mean that you couldn't
11 convince me about the materials, but I don't have to reach that
12 right now. So what I propose is the following: That we will
13 in this argument reveal to the entire universe the name of this
14 company, but that if you want to ask that particular data such
15 as profit data remain under confidentiality protection, you may
16 do so by a brief submitted no later – what do you want? I was
17 going to say a week, but I think you probably are celebrating
18 Thanksgiving.

19 MR. BACON: I was hoping to, your Honor.

20 THE COURT: Me too. So how about on the Monday after
21 Thanksgiving?

22 MR. BACON: That would be great, your Honor.

23 THE COURT: Okay. And if either of the parties want
24 to be heard, you don't have to submit anything, but if you want
25 to, you can submit a brief three business days later and then

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1 I'll resolve it. Okay?

2 MR. BACON: Thank you, your Honor.

3 THE COURT: All right. So jumping right into it, the
4 name of the company is Jump. Okay.

5 My question, though, is the first 15 paragraphs of
6 Dr. Hendershott's report seems to be nothing to do with his
7 expertise. It's really only maybe as late as paragraph 33 that
8 we get into what I understand is his area of expertise, market
9 microstructure. So my question is whether I should at least
10 strike the first part of the report.

11 MR. HENKIN: The answer to that is no, your Honor. I
12 think what you will hear from Professor Hendershott -- and I
13 assume that you will be hearing from him?

14 THE COURT: Yes.

15 MR. HENKIN: Is that this is the way he generally
16 writes papers when he is addressing anything that is of the
17 type that he generally writes papers on, including some of the
18 ones that are cited in his report where there's an
19 introduction. And I think the SEC says there are 17 paragraphs
20 that are about blockchain technology and it thinks he's not
21 qualified on that.

22 And there are two responses to that. One is we don't
23 think it's that many, we think there are really only seven or
24 eight, but that really what that is is it's background to put
25 into context all of what comes later. And when you also hear

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1 from Professor Hendershott about what his specific background
2 is, for example, his Ph.D. is in -- I believe it's in
3 operations and information management, and he has had quite a
4 bit of experience that directly relates to the blockchain. We
5 have even some demonstratives that we can put that will show
6 that. He has more than enough experience to address those
7 aspects of his report. But at the end of the day, they are in
8 the nature of background for what follows, and his opinions
9 wouldn't change one way or the other.

10 THE COURT: Well, are you saying that you don't really
11 care whether they're included or not?

12 MR. HENKIN: No, I'm not saying I don't care.

13 What I'm saying is that the objection to those
14 paragraphs is really not appropriate, given that they are in
15 the nature of background for the report. I think what you can
16 look at is -- probably the best example that I can think of is
17 what Judge Furman in the *City of Providence* case with respect
18 to Mr. Lauer's declaration, this is a case that we cite in our
19 Daubert motion for Professor Mizrach where there was some
20 background information that was challenged. There was some
21 background sections of the report and Judge Furman struck all
22 of the substantive opinions, but then dropped a footnote in the
23 decision that said, "I'm not striking the background, but it
24 doesn't matter that I'm not striking the background." We're in
25 kind of the reverse situation here.

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1 THE COURT: All right. Let me hear from the SEC.

2 MR. CARNEY: Thank you, your Honor.

3 So I think we highlighted one of the key exchanges in
4 our brief, and that's where I asked Dr. Hendershott at his
5 deposition, I said, generally speaking, how many key components
6 are there in the blockchain? And he responded, "Key components
7 to the blockchain? What do you mean 'key components?'" And
8 then I handed him his expert report that had paragraphs
9 explaining the five key components of the blockchain.

10 And that to us highlights why a professional witness,
11 someone -- Daubert talks about it and other cases, the *Nimely*
12 case from the Second Circuit, talk about the influence that an
13 expert witness can have on a jury. And so if you have a
14 professional expert witness, someone with a lot of experience
15 testifying in front of a jury, he might not know the subject
16 matter, might not be his expertise, but he gets up there and
17 starts saying things about how the Terra ecosystem worked, how
18 Anchor was a decentralized system, these aren't, as Mr. Henkin
19 said, background facts in the litigation. This is the
20 litigation, whether Anchor was decentralized or not, the SEC
21 says it most certainly was not decentralized. So to have an
22 expert get up who doesn't have the expertise and say Anchor was
23 a decentralized system, that creates serious risks.

24 THE COURT: Although a different view, though not
25 universally held, but there have been at least a lot of studies

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1 of mock juries that suggest that when parties call competing
2 experts, the jury says screw the experts, we'll decide it on
3 the facts.

4 MR. CARNEY: That's true.

5 THE COURT: But we don't know that.

6 MR. CARNEY: I believe there's a district court judge
7 in New Mexico that cites that in every footnote in his cases.

8 THE COURT: Sounds like a brilliant judge to me.

9 Okay. So let's assume hypothetically that I strike
10 that part of the report. What about the rest?

11 MR. CARNEY: So the rest of our objection relates to
12 the fact that Professor Hendershott in his 97-page response to
13 Dr. Mizrach's 30-page report never addresses and never even
14 looked at the agreements that Jump had with Terraform. And
15 these were agreements that they had to acquire tens of millions
16 of LUNA. And it's important because it creates and shows an
17 incentive on Jump's part to support the peg. As I'm sure your
18 Honor is aware, UST and LUNA were closely tied together. And
19 so if UST's peg personally dropped and it collapsed, which is
20 what ultimately happened, LUNA was going with it.

21 THE COURT: Yes. So I understand that that created
22 all sorts of motivations which may be highly relevant to the
23 assessment of their roles before a jury, but as I understand
24 his report, he was just saying that he was assessing whether
25 Jump's trading played a role in pushing UST's price back up to

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1 \$1 in May, 2021. And it's not clear to me how the
2 consideration of Jump's motives for those trades would
3 disqualify or so materially affect his conclusions as to make
4 them inadmissible.

5 MR. CARNEY: The reason why is Professor Hendershott
6 did not do his own model in this case. He purported to
7 critique Dr. Mizrach's model. And one of the main criticisms
8 that he offers of that model is that Dr. Mizrach failed to
9 account for the fact that other traders, had Jump not been
10 there, other traders might have been incentivized to step in
11 and engage in the exact same kind of trading that Jump did.
12 And why do I know they have an incentive? Because Jump earned
13 a [REDACTED] profit from acquiring these [REDACTED] of UST on
14 May 23, 2021. So he sees the [REDACTED] profit and says Jump had
15 an incentive. So therefore, all these other traders would have
16 had an incentive, too, and they might have stepped in.

17 And that ignores the unique situation that Jump had
18 agreements that allowed them to acquire [REDACTED] worth of
19 LUNA. Besides that, at the time, May 23, 2021, Jump also
20 already held [REDACTED] worth of LUNA. And
21 while UST was falling on May 23, 2021, so was LUNA, and Jump
22 was losing [REDACTED] with its held LUNA
23 precipitously dropping. And those are the incentives, those
24 are the ones that matter. And you can't point to a [REDACTED]
25 profit that they earned from acquiring a [REDACTED] in UST

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Hendershott - Direct

1 to support the peg and say that any other trader in the world
2 would have risked [REDACTED] to earn [REDACTED] on a token that
3 was rapidly declining. And so it's a failure to consider the
4 entire context of what was going on with Jump that we point to
5 as a criticism.

6 THE COURT: Let's get the witness up on the stand.

7 TERRENCE HENDERSHOTT,

8 called as a witness by the Defendants,

9 having been duly sworn, testified as follows:

10 DIRECT EXAMINATION

11 BY THE COURT:

12 THE COURT: And if I'm not mistaken, you're also from
13 Berkeley?

14 THE WITNESS: I am.

15 THE COURT: So what about the point just made by the
16 SEC counsel?

17 THE WITNESS: I don't believe I would characterize my
18 opinions the way the SEC did. So what I looked -- so the first
19 thing is that, indeed, as your Honor pointed out, the
20 motivations don't enter into the statistical model. So in
21 terms of evaluating Dr. Mizrach's statistical model, motivation
22 or agreements aren't part of that.

23 Now, the SEC was referring to a particular opinion
24 which was I examined whether or not Jump -- so in a case where
25 you might think someone is doing something for reasons other

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Hendershott - Direct

1 than a profit motive, you would examine what their profits are.
2 And so I calculated what their profits were on what they did.
3 I made no statement about that -- well, that means that lots of
4 other people would have, but they potentially could have. And
5 whether or not [REDACTED] would have been enough incentive for
6 other people to do it is a question that's sort of separate
7 from whether or not Jump had other motivations to do it.

8 I wanted to focus on what Jump's revenues were from
9 that trading and whether or not someone else, therefore, might
10 have had an incentive to do it. Whether or not Jump had other
11 incentive is a separate question. I was merely trying to say,
12 well, might someone else have done the same thing? And if they
13 had, would they have made money?

14 THE COURT: By the way, I notice that you were paid
15 \$1,400 an hour, and if I remember correctly, your colleague,
16 Dr. Parlour, was paid considerably less. Does that mean you're
17 a lot better than she is?

18 THE WITNESS: Christine is wonderful colleague, and I
19 certainly would never say that. I might have more experience
20 than she does, although I'm not sure I would refer to myself as
21 a professional witness. I try and be professional, but I've
22 only testified in front of a jury once.

23 THE COURT: Okay. Well, you may have that opportunity
24 again. Okay.

25 What about the part about blockchain? Why shouldn't I

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Hendershott - Direct

1 just get rid of that? It's not central to your opinions.

2 THE WITNESS: Well, it's not central to my opinion,
3 but, as Mr. Henkin pointed out that -- you know, so at the
4 latter part of my report, I talk about what happened in 2022
5 and the Anchor withdrawals and things like that. So explaining
6 what Anchor is is relevant for understanding that later, and so
7 I wrote those initial parts. They're heavily footnoted. I've
8 published a paper that was a survey article on financial
9 technology that talked about the blockchain and made a number
10 of those same points. So I have a publication that does a
11 similar thing, and I was characterizing them the way an
12 economist would in -- at a high level. I'm not offering any
13 technical opinions about how it works.

14 And I'm also -- you know, those characterizations are
15 similar to the academic literature that's looked at the Terra
16 blockchain. The paper that Dr. Mizrach cites by Liu, Makarov,
17 and Schoar, you know, talks about Terra being decentralized and
18 Anchor. And so I wasn't saying anything that I was intended to
19 be controversial.

20 THE COURT: But that's not the test. The test under
21 rule -- you're not a lawyer, but I can congratulate you on
22 that. But the test that I have to apply is whether the
23 opinions you're offering are within your area of expertise,
24 whether you derive them through an appropriate methodology,
25 whether you applied that methodology consistently, etc., etc.

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Hendershott - Direct

1 So the fact that you once did a paper that had the similar
2 situation, that's neither here nor there.

3 THE WITNESS: Well --

4 THE COURT: The question is whether you have the
5 expertise in that area. I could write a paper about the
6 considerable defects of the Yankees management, but I would not
7 claim that my expertise is in that area.

8 THE WITNESS: So my expertise has been studying
9 technology and financial markets for the last 30 years. And
10 the blockchain is a new kind of financial market, right? My
11 first job was in a department called Computers and Information
12 Systems when Berkeley hired me. I'm in the Operations and
13 Information Technology Management Group. I'm basically the
14 information technology management person; the other people are
15 more operations.

16 I oversaw a research center. I was a codirector of it
17 for ten years on technology and management. We started up a
18 research center on innovative financial technology that I was
19 the director of. I've been the chair of the group I mentioned
20 for almost the last decade, so I have a -- my entire career is
21 about studying technology and understanding how it works in
22 markets. And when I write papers that have technology and then
23 talk about the market microstructure of it, I provide the sort
24 of backgrounds, and I use the same methodology in my expert
25 report that I do in my academic work to provide that

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Hendershott - Cross

1 background.

2 THE COURT: All right. Unlike the other two experts,
3 I think because of the potential greater materiality, if you
4 will, of the dispute between Dr. Edman and Dr. Hendershott, I
5 will allow the SEC to put some questions and then allow defense
6 counsel to put some questions, just a few. I don't want to
7 take a lot of time with this, but if you want to put a few
8 questions, you may. Or if you want to play Perry Mason, you
9 can go right up to him.

10 CROSS-EXAMINATION

11 BY MR. CARNEY:

12 Q Good afternoon, Dr. Hendershott.

13 Now, you calculated that the Jump's profits on their
14 long position UST on May 23, 2021, were approximately [REDACTED],
15 right?

16 A I believe so.

17 Q Okay. And you believe that the profitable trading
18 undertaken by Jump indicates that other traders might have done
19 the same, right?

20 A It indicates that someone who traded like this made money,
21 so other people might have done so.

22 Q Okay. And you don't know whether other traders or firms
23 have the same incentives as Jump, though, right?

24 A I mean, everyone has a profit incentive. If you're asking
25 about did they have the other incentives or other agreements?

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Hendershott - Cross

1 No, I haven't seen an analysis by Dr. Mizrach that analyzed
2 everyone else's incentives, so I don't know.

3 Q You didn't do such an analysis yourself, right?

4 A No.

5 Q Okay. And Jump's trading and in [REDACTED], which is the
6 algorithm they used, right? It would not have been profitable
7 if the UST peg was not restored to \$1, right?

8 A I didn't calculate that. But if you bought UST and the
9 price went down to a lower price, then indeed, you would lose
10 money. But there were lots of other people who were buying UST
11 that day as well.

12 Q Okay. And you'd agree that when Jump took their long
13 position, they didn't know that their trades would be
14 profitable, right?

15 A A trader -- it's a rare trade where you know you'd be
16 profitable when you make it, so no, they wouldn't know.

17 Q And in fact, any trader on May 23, 2021, who took a long
18 position in UST at a price of [REDACTED] wouldn't know for sure
19 whether the trade was going to be profitable, right?

20 A I think it's very difficult to predict future price
21 changes, so you can't be certain.

22 Q Are you aware of any other traders that also took a
23 [REDACTED] on UST on May 23, 2021?

24 A So non-Jump traders bought 125 million UST that day.
25 Whether or not any of them were individual traders, I don't

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Hendershott - Cross

1 know, because, I mean, I was really critiquing Dr. Mizrach's
2 report, and he didn't do that analysis.

3 Q Okay. So were any of those traders within the 120 million
4 you mentioned individually acquiring [REDACTED] worth?

5 A As I said, I don't know.

6 Q Okay. And in your report, you didn't consider whether
7 other traders took large long positions when UST was below \$1
8 on May 23, 2021, right?

9 A No. Dr. Mizrach did not, and I did not.

10 Q And in your report, you didn't consider whether other
11 traders made a profit taking a long position on UST on May 23,
12 2021, right?

13 A People who bought at the same time Jump would have or did
14 would have made a profit. People who bought it at other times,
15 I'm not sure.

16 Q Okay. And so when you stated, as we just mentioned
17 earlier, that Jump's [REDACTED] profits, that because of that,
18 other market participants would have had an incentive to trade
19 in a similar matter, you were basing that on the [REDACTED]
20 profits that you calculated, right?

21 A Yes. This was a trade that turned out to be profitable, so
22 other people had an incentive. How strong that incentive is is
23 another question.

24 Q So incentives were relevant to your opinions, right?

25 A So I was looking at the -- you know, whether or not some

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Hendershott - Cross

1 trading was profitable to see whether or not someone else would
2 have done it. That's what I was looking at.

3 Q All right. And you did not review Jump's agreement with
4 Terra in forming your opinions, right?

5 A It depends upon what you mean by "review." So in terms
6 of -- Dr. Mizrach had long sections that talk about the flows
7 in of LUNA that occurred well after May 23. And I read those,
8 and I did not dispute them. But I was aware of them, so I
9 certainly considered them.

10 Q You read the sections of his report?

11 A Yes.

12 Q But you never looked at the agreements themselves, did you?

13 A There's -- I believe his report summarizes what he
14 characterizes as the agreements, but no, I didn't look beyond
15 that.

16 Q And you know the agreements were entered into before
17 May 23, 2021, right?

18 A It depends upon which agreements you're -- so I -- it's my
19 understanding, but -- and this is from counsel, is that there
20 were various agreements over time. Some of them may have
21 preceded May 23.

22 Q And then there was the one that was amended in July of
23 2021, right?

24 A That's what I was making reference to.

25 Q And you didn't review that agreement either, right?

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Hendershott - Cross

1 A Well, I -- Dr. Mizrach talks about that -- those transfers
2 that occurred and did calculations of where the LUNA went, and
3 I read his report and considered that.

4 THE COURT: Let me ask you a different question.
5 Since your testimony and report are being offered in rebuttal
6 of Dr. Mizrach's report, the SEC says that you used two papers,
7 you relied on two papers by Dr. Mizrach. You used a similar
8 model to the one he used here in your declaration in the case
9 of *CFTC v. Nav Sarao Futures Limited*; is that correct?

10 THE WITNESS: Yes, that's correct. Although the
11 question is how similar they were, but I can talk about that at
12 length if you want.

13 THE COURT: Well, I might put that off to another
14 time, but my question is -- so you're not disputing his
15 expertise? You're only disputing what, how he applied his
16 model in this case?

17 THE WITNESS: I can make very -- if you'd like me to
18 talk about the *Sarao* case and how this case is different from
19 it and how my -- what my criticisms of Dr. Mizrach, how those
20 relate to *Sarao*, I've got a demonstrative that would summarize
21 it very shortly.

22 THE COURT: No. I thank you, and not because I
23 wouldn't be interested to hear, but we unfortunately have a lot
24 to cover. All right. Questions from defense counsel? I know
25 you wanted to ask more questions, but just as I cut off the

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Hendershott - Redirect

1 witness, I'm cutting off you as well. Defense counsel?

2 REDIRECT EXAMINATION

3 BY MR. HENKIN:

4 Q Professor Hendershott, where in the model that Dr. Mizrach
5 used are what the SEC has called incentives taken into account?

6 A Not anywhere that I'm aware of.

7 Q And the SEC has questioned your use of the word
8 "decentralization." Are you offering an opinion about whether
9 anything in this case was decentralized or not? Or are you
10 just discussing it as a generic term?

11 A I was discussing it as a generic term.

12 Q I would like you to talk about the *Sarao* case and, in
13 particular, what opinion you were asked to render by the CFTC
14 in that case and what you did render in that case.

15 A So in particular in the *Sarao* case, this was about the
16 flash crash, when a trader in London was allege -- he pleaded
17 guilty to spoofing eventually. And so in that case, there --
18 it was again -- I used a model that related to Dr. Mizrach's
19 model that -- and to assess the price impact of *Sarao*'s
20 trading. And the question is what can you do with such a model
21 conceptually? And so conceptually, it basically looks at the
22 ordering of events or how, you know, trading precedes price
23 changes.

24 And you can only -- you can calculate something that's
25 called a price impact. But then, to say what would happen in

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Hendershott - Redirect

1 the absence of that trading requires a lot more. You have to
2 do -- you have to have some way of determining how you think
3 other buyers and sellers would've behaved, and that's what
4 Dr. Mizrach doesn't do this that case. That's what I told the
5 CFTC was very hard to do, so I declined to assert to make any
6 opinion about what the price would have been in the absence of
7 Sarao's trading, unlike Dr. Mizrach in that case, who opines
8 about what the price would have been but for Jump's trading.

9 And the second thing is there were large events,
10 right, there was the flash crash that was -- Dr. Sarao, the
11 CFTC was saying he played a role in, and they asked me do I
12 think that my model could support claiming that he caused the
13 flash crash? And I said no, you need to do a lot more than
14 just calculate a price impact to be able to say someone caused
15 something.

16 And the analogous thing in this case is did Jump cause
17 the repeg? And this was exactly what I was talking to
18 Mr. Carney about is that you have to understand how other
19 people might have traded if prices -- if Jump hadn't bought,
20 would other people have bought? Were there other buyers?
21 There were a lot of other buyers that day, and Mr. Mizrach is
22 making very sort of extreme assumptions that no new buyers
23 would have come up, even after price falls all the way to zero
24 and people had bought UST before Jump did its alleged
25 intervention --

NBHJSECH

Hendershott - Redirect

1 THE COURT: Well, forgive me for interrupting. All
2 the questions I have – and this is really more a question for
3 counsel, but I'll raise it now. Given what you were just
4 discussing, one of the central allegations in this case is that
5 Terraform falsely represented that its pegging of the \$1 price
6 for its tokens was the result of an automatic
7 self-stabilization and not through the intervention of some
8 third party such as Jump.

9 And my understanding is that the SEC's going to
10 present evidence from whistleblowers that Jump or other places
11 that will say when there was this huge crisis that ultimately
12 destroyed hundreds of millions, if not billions of dollars,
13 they attempted to pretend that their automatic algorithm was
14 stabilizing the price at \$1 when, in fact, what was happening
15 was that there was a huge infusion of cash, secret infusion of
16 cash that propped up the price for a while.

17 I'm not clear why either your opinion or the SEC's
18 expert's opinion really bears on any of that more than
19 tangentially. It's a simple factual question. If they said to
20 the public we're maintaining the price automatically through
21 this very clever algorithm that keeps it at \$1 dollar and, in
22 fact, they knew that was a lie and that they were dependent on
23 Jump, the fact that, theoretically, some other people might
24 have entered the market seems to me to be not irrelevant
25 perhaps, but very tangential.

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Hendershott - Redirect

1 THE WITNESS: So my understanding of the SEC or
2 Dr. Mizrach's opinion is that he claims that his model shows
3 that Jump was responsible for that repegging.

4 THE COURT: I understand. And you're saying that you
5 disagree with that. But if the question is that I say to the
6 public it's going to happen through our algorithm and I know at
7 the time I make that statement that that's baloney, it doesn't
8 matter what might have happened theoretically.

9 THE WITNESS: Well, I'm a rebuttal witness and --

10 THE COURT: No. I'm not saying that what Dr. Mizrach
11 or you say is irrelevant. It would be perhaps corroboration if
12 you took his position of what the SEC is saying, and it would
13 be not corroboration if the jury agrees with you. I'm just
14 having a little difficulty seeing why it's a central matter in
15 this case, but that's really a question for counsel.

16 THE WITNESS: Well, I mean it's -- I'm happy to
17 respond a little bit if you'd like me to.

18 THE COURT: Sure.

19 THE WITNESS: So I mean, there is this question of --
20 and I don't know what evidence the SEC is going to offer about
21 what the Terraform state of mind was, but the SEC attributed
22 the recovery to the trading of the -- of Jump. And there's
23 just -- the price impact model that Dr. Mizrach uses by itself
24 does not allow you to --

25 THE COURT: Well, I know that's your opinion.

NBHJSECH

Hendershott - Redirect

1 THE WITNESS: That's fine.

2 THE COURT: And that's why I say this is really not a
3 question for you.

4 Okay. We'll let you sit down. Thank you very much.

5 MR. CARNEY: Did your Honor want us to address that
6 briefly or --

7 THE COURT: Yes.

8 (Witness excused)

9 MR. CARNEY: So your Honor, I think the SEC shares
10 your assessment -- and we've laid that out in our summary
11 judgment briefing -- that the relevant fact is that Terraform
12 had secretly entered into this agreement with Jump to help
13 restore the peg outside of the algorithm. And I think it's
14 important that the algorithm is something that's happening on
15 the Terra blockchain where people are going on and they're
16 burning UST in exchange for LUNA and vice versa, where the sort
17 of support and propping up of UST that we're talking about here
18 is all happening off the Terra blockchain on these centralized
19 exchanges where people are buying UST or Jump is buying UST in
20 exchange for non-Terraform cryptocurrencies, which is driving
21 the price of UST up.

22 And so our allegation is that they were going out in
23 the public and saying it was our algorithm that's on chain that
24 is allowing this equilibrium to be kept in place and to keep
25 UST at \$1 when, in actuality, they had reached an agreement on

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1 the morning of May 23, 2021 with Jump, when they saw the USD
2 depegging to go in and go onto these centralized exchanges and
3 buy up UST to get that price up. Now, we hired an expert in
4 order to assess, well, what was the -- we know about this
5 agreement, we know that they were buying UST. Let's get their
6 trading records. You tell us. You're the expert; we're not
7 experts. What was the effect of that trading? And so he
8 reached --

9 THE COURT: My point -- and I do want to thank you and
10 I'll give you an opportunity to be heard on this. I'm a little
11 sorry, given the shortness of time, that I raised this
12 digression. My point is if you've entered into a secret
13 agreement and you are representing to the public, oh, the
14 reason it's at \$1 is that the combination of your brilliant
15 algorithm and natural forces, but really you're relying on a
16 secret agreement to do it, the fact that maybe theoretically
17 the natural forces may have achieved this is neither here nor
18 there. It would still be a lie.

19 But let me hear from defense counsel.

20 MR. HENKIN: So your Honor, I think what we're dealing
21 with here is you have to start with what's the SEC's
22 allegation. And the SEC's allegation here that relates to the
23 reports that we're talking about from Professor Hendershott and
24 Professor Mizrach is that Jump was the cause of the repeg in
25 May of 2021. And to the extent that that is the issue before

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Mizrach - Direct

1 the Court, the Court needs to address whether Dr. Mizrach --
2 whether the SEC --

3 THE COURT: I agree, I have to address it. That's why
4 I say it's my fault for raising an unfortunate digression.

5 MR. HENKIN: And I think the rest of this goes to
6 whatever other evidence the SEC intends to offer. And your
7 Honor's going to have to address that in connection with
8 summary judgment because it's not in any of the reports here.
9 And so the idea that there might be whistleblowers and whether
10 any of that evidence is admissible is a separate issue. It's
11 got nothing to do about whether Professor Mizrach's model is
12 admissible under Daubert and Rule 702.

13 THE COURT: I agree with that. So let's get
14 Mr. Mizrach up here, and then I'll also want to put some
15 questions to counsel with regard to him.

16 BRUCE MIZRACH,

17 called as a witness by the Plaintiff,

18 having been duly sworn, testified as follows:

19 DIRECT EXAMINATION

20 BY THE COURT:

21 THE COURT: So Mr. Mizrach, thank you for being here,
22 although I think you only had to come from New Jersey, but, you
23 know, that can be a burden.

24 THE WITNESS: New Jersey Transit is quite the
25 experience.

NBHJSECH

Mizrach - Direct

1 THE COURT: Always a questionable trip.

2 So as I understand, the defense objections to your
3 report is that your methodology might be appropriate for
4 determining what price changes Jump's trading might have been
5 predicted to cause, but that's different from saying that they
6 actually caused it. So what about that?

7 THE WITNESS: Well, so two things: The model has two
8 parts. There first part is what's known as a vector
9 autoregression. This involves, in this particular case,
10 returns, in this case, of UST/Tether. But I want to make sure
11 the Court's aware, also, that we've analyzed another pair. But
12 most of the attention of Dr. Hendershott has been focused on
13 the USDT/UST pair. But I've also analyzed the Bitcoin/UST pair
14 as well.

15 So the VAR part tells us something about how did the
16 events of that day or this trading period were influenced with
17 one another. And one thing that comes out of the lengthy
18 research on microstructure is that order flow is very
19 important. We need to know the direction and sign of order
20 flow. And then we see how it influences returns.

21 But then causal statements come, actually, from the
22 inversion of that model, too, something called the impulse
23 response. This might not be forum, but once you invert it, you
24 then represent the history in a series of orthogonal shocks.
25 And orthogonal is a fancy statistical way of saying that these

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Mizrach - Direct

1 are causal. So we can actually look at causal factors once we
2 invert the VAR for the impulse response, then we can draw
3 causal conclusions about the behavior of market participants.

4 THE COURT: So the defendants say that you, "Did not
5 conduct a sanity check." We'll get back to that in a minute
6 against the real world data because, under your model, if there
7 was a sufficient panic in the UST market, under your model, the
8 trading price would have been less than zero, which is clearly
9 impossible. So what about that?

10 THE WITNESS: Well, there's a statistical explanation,
11 and then there's the logical expansion. The statistical
12 explanation is that at certain points in the day - and the
13 really key point of the day begins with 1430 to 15 GMT, where
14 other evidence in the case talks about what was going on
15 between Jump and TFL. But associated with that, Jump typically
16 traded only [REDACTED] UST, and that's a statement with respect
17 top May 1 to May 18.

18 And then, in this one half hour, they traded
19 [REDACTED] UST, so [REDACTED] in a half an hour than they
20 typically traded in a day. So when you confront data like
21 this, unfortunately, the standard errors tend to be bigger, and
22 the standard errors here included zero. I could've put in
23 fancier techniques that would have actually truncated the
24 standard errors from going to zero, but in fact, I thought it
25 was better to use the standard methodology, even with this

NBHJSECH

Mizrach - Direct

1 potential implication.

2 Now the second part, if I may, is to go to the logical
3 part. Yes, this is a panic, and so we really have no idea how
4 much buying is necessary to stem the panic in that moment. And
5 they didn't have the stem the panic once; they had to stem the
6 panic twice. There's also an hour at the end the day on May 23
7 when they have to intervene again in large scale in manual
8 trading.

9 So the logical test is, of course, if the selling
10 pressure had not been alleviated, one of two things would have
11 happened. And you'll have to speculate about what Jump might
12 have done, and that would have been to intervene even more,
13 so -- in the timeframe. But we know it was sufficient in that
14 timeframe, and both of those timeframes, Jump simply provided
15 sufficient capital to support the pay. And logically, we know
16 that selling would have stopped at zero.

17 THE COURT: All right. I'm going to give defense
18 counsel and SEC counsel the same opportunity I gave with
19 Dr. Hendershott to put questions. But before I do it -- and
20 this falls under the category of a strange exercise of judicial
21 discretion -- I was struck by the use of the term "sanity check"
22 in the papers.

23 And it reminded me of something that none of our
24 guests ever heard of, which is the Marx Brothers film, "A Night
25 At The Opera." And in that very great movie, Groucho is

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Mizrach - Cross

1 negotiating a contract with Chico, and they keep agreeing to
2 remove this clause and that clause. And finally, they get down
3 to the final clause, the sanity clause. Do you want to play
4 that, please.

5 (Video played)

6 THE COURT: So I'm sure you wanted me to share that
7 with you. Okay. Let's get serious again.

8 Some questions from defense counsel for the witness.

9 CROSS-EXAMINATION

10 BY MR. HENKIN:

11 Q Professor, would you agree with me that the price of UST
12 was increasing prior to the 1430 UTC period during which Jump
13 started what you've termed the active trading?

14 A The price of UST moves up and down. I don't have the
15 figure burned into my cortex, but you can look at my report and
16 you'll see it's moving up and down before 1430.

17 Q Would you agree that it had moved from approximately [REDACTED]
18 [REDACTED] to approximately [REDACTED] before Jump started what you
19 call the active trading?

20 A I'd have to look back at the graph before I'd say yes or
21 no. Since I don't have it in front of me, I'm going to just
22 say maybe.

23 Q And would you agree that you use the same methodology in
24 analyzing both currency pairs that you talked about? So the
25 Bitcoin/UST and the Tether/UST pairs?

NBHJSECH

Mizrach - Cross

1 A Correct. And part of that was the decision to model all of
2 Jump's buying, regardless of what form it took, whether passive
3 or active, as Professor Hendershott would like to consider it,
4 and that definitely, in fact, took into account exactly the
5 agreements that took place between Terraform and Jump. So the
6 question came up in Dr. Hendershott's testimony where he's
7 saying that the incentives don't matter in the model. No, the
8 incentives very much matter in the model. And that is the
9 reason why I made the decision to model Jump's buying, whether
10 passive or active, as being indicative of the trade direction.

11 Q And would you agree that, separate from Jump's purchases on
12 May 23, there were net purchases of 125 million UST by other
13 market participants on May 23?

14 A You'd have to show me in which pairs and break that down.
15 So far the discussion in my report is confined to the
16 Tether/UST pair and the BTC/UST pair and also the aggregate, in
17 this case the net amount, of purchases by Jump across ten
18 different trading pairs.

19 Q And your model depends on the notion that all non-Jump
20 trading is impounded into what you call the midquote, right?

21 A Well, I don't create the midquote. The midquote is created
22 by the market. And so that's why I make the statement that I
23 do.

24 Q No. No. No. But your model depends on the notion that
25 trading by anybody else, information about trading by anybody

NBHJSECH

Mizrach - Cross

1 other than Jump is impounded into the midquote at any point in
2 time, right?

3 A It's impounded, but both in the midquote and also the fact
4 that Jump is not doing any self-trading on this particular day.

5 Q And so that means that if Jump trades at time T, and then
6 Jump trades again, let's say, 10 seconds later, your model
7 depends on the assumption that information about everyone else
8 who traded in between in that 10 second gap is impounded into
9 the midquote at the 10 second later time?

10 A So the causal claims would require someone to demonstrate
11 that there was another party, another entity that was trading
12 in the same size, same timeframe, and also same direction as
13 Jump. And I don't see such a party in the data, particularly
14 in the most crucial times of the day. Jump is the only one
15 buying.

16 Q Where in your report do you discuss any analysis that you
17 did of trading between the midquotes?

18 A It came up in the rebuttal because there was a large debate
19 between Professor Hendershott and I about trade direction.

20 Q And did you, in your rebuttal report, dispute the results
21 that Professor Hendershott came up with that your midquotes
22 didn't, in fact, include information about non-Jump trades?

23 A So the primary things that I addressed in the rebuttal
24 report, because I'm limited in scope, I'm not going to provide
25 new arguments; they're simply responding to points raised by

NBHJSECH

Mizrach - Cross

1 Professor Hendershott. And so there are a number of criticisms
2 of his alternative specifications, but I think the real bottom
3 line on that is from what Professor Hendershott said in his
4 deposition, that he didn't take any of these models seriously.

5 Q But that's not the question I ask. Professor Hendershott
6 looked at the assumption that you made, which is that all
7 non-Jump trading was in implied into the midquote or was
8 impounded into the midquote. And he used your data and he
9 concluded that, in fact, that was incorrect. Do you dispute
10 his result?

11 A Yes. Because this is precisely what the impulse response
12 is doing. It's putting those forces into the background and
13 isolating the effect of Jump's trading.

14 Q And where in your rebuttal report is the data that disputes
15 that result?

16 A It's the same data that I used in my initial report. It's
17 a VAR specifying sine trade direction influenced by the
18 information that I had about Jump's agreements with TFL and
19 corresponding quotes from the midquote that came from the best
20 bidder offer from the KuCoin exchange. And again, we're just
21 talking about the one pair, so the data is the same. I haven't
22 changed anything about the data or analysis. I'm just
23 responding to specific points from Professor Hendershott's
24 report.

25 THE COURT: I need to get cut you off, but questions

NBHJSECH

Mizrach - Redirect

1 from the SEC?

2 MR. CARNEY: Sure. I'll keep it brief, your Honor.

3 REDIRECT EXAMINATION

4 BY MR. CARNEY:

5 Q So Professor Mizrach, does your price impact analysis
6 generate a negative price?

7 A No. It predicts that there was a -- at the median, roughly
8 an 8 cents per million price impact. But it is true, then,
9 that the tails of that extend into negative prices.

10 Q And you talked about this in response to his Honor's
11 questions, but why was the period from 1430 to 1500 GMT on
12 May 23 critical to the Tether/UST pair?

13 A Well, so generally, I don't have access to the kind of data
14 that I have in this particular class, certainly not in my
15 academic work, and even sometimes not in my regulatory work.
16 And so the -- I think the most important exhibit, the one that
17 I think that this tribunal should definitely be talking most
18 about, is that massive trading position that differs from all
19 of Jump's trading activity prior to that point.

20 And so you would be negligent, in my view, to not then
21 go into the textual record, as I talk about it, to try to
22 understand why all of a sudden after basically trading like --
23 in small positions as a market maker in UST does Jump again
24 begin this large-scale directional trading.

25 Q And Dr. Hendershott claims that during a 30-minute period

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Edman - Direct

1 where Jump makes [REDACTED], the
2 price of UST [REDACTED]. Whereas your model predicts
3 the price impact to be [REDACTED]. What is your interpretation
4 of what occurred in that 30-minute period?

5 A So the period between 1430 and 15 appears to be a period of
6 panic in UST. So selling accelerates. I don't fully know the
7 reasons. I'm sure the Jump witnesses can probably tell us
8 about that. But what I'm actually showing is -- and that's
9 what the price impact model is telling you, is saying where
10 would the price have been had it not been for these large
11 directional purchases by Jump.

12 MR. CARNEY: Thank you.

13 THE COURT: You may step down. Thank you very much.

14 (Witness excused)

15 THE COURT: We have one more witness.

16 I should tell counsel that at 4:00 I have to take a
17 15-minute call in my chambers on another matter. But if we're
18 not finished, we'll come back at 4:15, finish off then.

19 Let's get the other witness, Dr. Edman on the stand.
20 Is he here? Yes, he is.

21 MATTHEW EDMAN,

22 called as a witness by the Plaintiff,

23 having been duly sworn, testified as follows:

24 DIRECT EXAMINATION

25 BY THE COURT:

NBHJSECH

Edman - Direct

1 THE COURT: And how tall are you?

2 THE WITNESS: Approximately 6'3", but I feel like I'm
3 shrinking.

4 THE COURT: I was worried that might be the case.
5 Okay.

6 All right. So I wasn't totally clear what expertise
7 you would bring to bear here. Defendants argue that your
8 testimony should be excluded because you lack "sufficient
9 expertise in financial payment systems or payment processes,"
10 but as I understood it, what you were opining on is about the
11 Terra blockchain source code and its programming, but do I have
12 that right?

13 THE WITNESS: Yes, to an extent, sir.

14 THE COURT: Why don't you elaborate.

15 THE WITNESS: So my expertise in this case really
16 falls into two categories. The first one is source code
17 analysis where I was reviewing certain source code associated
18 with an application -- a number of applications, actually, that
19 Terraform implemented. The second category of expertise is in
20 blockchain analysis where I collected and analyzed blockchain
21 transactions created using that software.

22 THE COURT: So to put this in context, the overall
23 issue is the SEC's allegation that the representation by
24 Terraform that a company called Chai used the Terra blockchain
25 to process transactions was a lie, and really to disguise that

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Edman - Direct

1 lie, they were just copying what had independently been done by
2 Chai. It wasn't that Chai was using them – and this presumably
3 would be of importance to anyone who wanted to invest in
4 Terraform because if a big company is using Terraform for its
5 transactions, that would be material. So what I wasn't totally
6 clear on is what you are saying about that issue.

7 THE WITNESS: So my opinions related to that issue are
8 specific to whether or not these Chai transactions were
9 processed and settled on the Terraform blockchain. My opinions
10 aren't related to how Chai, for example, accepted credit cards.

11 THE COURT: You're just saying here's what we know
12 about how Terraform dealt with this?

13 THE WITNESS: Correct. Here's what we know about
14 these transactions on the Terra blockchain.

15 THE COURT: Okay. And how did you determine that?

16 THE WITNESS: I determined that by analyzing data from
17 a variety of sources. One of those sources is the source code
18 for a piece of the software called the LP server, which was
19 responsible in my opinion for generating transactions on the
20 Terra blockchain. I analyzed that software, determined the
21 nature of the transactions that the software created in the
22 Terra blockchain, collected and analyzed those transactions,
23 and looked at the interactions between addresses involved in
24 those transactions.

25 THE COURT: Okay. So rather than put further

NBHJSECH

Edman - Cross

1 questions myself, again, I'll give defense counsel the first
2 shot and then SEC counsel. Though we may have to interrupt for
3 a few minutes at 4:00 o'clock.

4 CROSS-EXAMINATION

5 BY MR. CALIFANO:

6 Q Good afternoon, Dr. Edman?

7 A Good afternoon.

8 Q So as part of your examination and analysis, one thing that
9 you agreed upon and determined was that the LP server uses
10 what's known as a RESTful API; is that correct?

11 A That's one component of it, yes.

12 Q But it was also the case, do you agree, that unless inputs
13 are made into that RESTful API, that LP server will not execute
14 any transactions on the blockchain; is that right?

15 A The LP server source code that I reviewed did require
16 inputs, whether via the RESTful API or via certain databases
17 that the LP server relied on.

18 Q But because you did not examine any of that input or could
19 not determine what system was providing that input, you could
20 not determine who or what was exercising control over those
21 transactions that the LP server was performing; is that right?

22 A Well, first, the inputs to the server were not available
23 for review.

24 THE COURT: Yes. I'm going to interrupt you on that
25 because that's something that I was unclear of from the papers.

NBHJSECH

Edman - Cross

1 As I understand it, there was some data that was requested, I
2 guess, by the SEC that was never produced, what? By Chai?

3 MR. CARNEY: Never produced by defendants. We had
4 discussions with, in particular Mr. Califano, who said he was
5 making his best efforts to obtain the data from a company
6 called Naver that was apparently hosting the data on behalf of
7 Gaza Labs, which was a Terra-affiliated company. And by virtue
8 of that, they were asking Naver to provide them the data, but
9 were unable to get Naver to turn the data over to them.

10 THE COURT: So what about that?

11 MR. CALIFANO: Well, your Honor, there's a little more
12 information, I think, that the Court needs to consider about
13 that. First of all, according to evidence that the SEC has
14 included in its own motion for summary judgment, the head of
15 engineering for e-wallets at Chai had explained that the LP
16 server actually sits with the Chai server on the Chai system.
17 What we do know from the information that was provided that was
18 available to TFL and was provided to the SEC was that control
19 of that Naver cloud was not in the hands of TFL.

20 TFL has produced every document and every relevant
21 piece of code or other data that it had in its possession. TFL
22 also made efforts to try to get access to any of that server
23 information through Gaza Labs and even through Naver cloud,
24 which is sort of like the Amazon web services for Korea. But
25 more importantly, your Honor, both the SEC and the defendants

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Edman - Cross

1 have made requests, which your Honor approved directly, to Chai
2 for all of this information and we are still waiting for it.
3 We want it, the SEC wants it, but we don't have it.

4 MR. CARNEY: Your Honor, if I --

5 THE COURT: Yes. But then we are going to have to
6 stop and then we'll resume it because this is not unimportant.
7 So I want to get everyone's view, but I guess my narrow
8 question at the moment is if the data is produced by Chai, then
9 doesn't it make sense then to give it to the experts for both
10 sides to allow a supplemental report from each side if it
11 changes anything in a material way, yes?

12 MR. CALIFANO: Yes, your Honor.

13 MR. CARNEY: Yes, your Honor.

14 THE COURT: You would agree with that? Okay.
15 And secondly, where is Chai located?

16 MR. CARNEY: In Korea.

17 THE COURT: Okay. All right. To be continued.
18 We will take a 15-minute break.

19 (Recess)

20 THE COURT: So just to finish up on that little
21 question, are there efforts that the SEC can apply for that
22 they haven't yet applied for to try to compel production of
23 those documents from Chai?

24 MR. CARNEY: Well, your Honor, first, I think it's
25 important to make clear that there's two separate sets of data

NBHJSECH

Edman - Cross

1 that we're talking about. And so when I was talking about the
2 efforts of defense counsel to obtain data, I was specifically
3 talking about their efforts to obtain Terraform data. There's
4 this device called the LP server, and the evidence shows that
5 it was Terraform employees, there was an employee by the name
6 of Paul Kim, and I think in some of the briefing you would've
7 seen the chat message. He's the fellow that says the LP server
8 is just replicating Chai transactions. So the LP server was
9 something that was controlled by Terraform, and we asked
10 Terraform for that. And that's what started this dialogue
11 which we attached to our briefing about their efforts to go to
12 Naver and get that information. So that's one category of
13 data.

14 THE COURT: Let's stop on that just for a minute so we
15 don't get two things confused. So what about that?

16 MR. CALIFANO: Your Honor, Paul Kim, according to the
17 evidence, was one of the people would wrote the code for the LP
18 server and wrote the code for another piece of operation that
19 Dr. Edman examined in his opinion. The operation of the LP
20 server was something that was conducted in Chai systems. That
21 information and that evidence is sitting in the government's
22 own filings in their motion for summary judgment.

23 What we have tried to do, nevertheless, because
24 Mr. Kim is a TFL employee and that kind of work that software
25 companies often perform by writing code for the operation of a

NBHJSECH

Edman - Cross

1 system that they may or may not fully control the operation of,
2 we have done everything we can to gather all the information in
3 our possession or in the possession of TFL and have produced it
4 to the SEC.

5 We are also interested in all of the data that was put
6 into the LP server and all of the structure of that Chai
7 payment system ourselves, which is why we have sought
8 independently to try to get that information. But we have had
9 to do what we have to do by going to third parties to get it
10 because we do not have possession of it and nor do we have
11 control over it. That is why we both made our independent
12 efforts to make those requests from Gaza Labs, which at one
13 point did initially open the version of Amazon web services
14 where all the Chai systems were operated. We have gone to the
15 actual web hosting company to try to get them to respond to us,
16 and we have joined the SEC in making those requests to Chai
17 because we would also like to see that data.

18 THE COURT: So to the extent that the data has not
19 been produced that was requested, is any of that data in or
20 controlled by companies in the U.S.?

21 MR. CALIFANO: Not that we're at all aware of, your
22 Honor. It's all in Korea.

23 THE COURT: Okay. So then I want to come back to the
24 SEC. So I know you made and I approved your applications. I'm
25 just wondering whether there are other things that could be

NBHJSECH

Edman - Cross

1 done to try to have those applications complied with. So any
2 thoughts on that?

3 MR. CARNEY: I mean, we could certainly give it some
4 thought. I know that a request from your Honor carries a lot
5 more weight than a request from us, so I'm not sure --

6 THE COURT: That's why I'm raising it. I'm happy to
7 make requests, but I need to see what's -- there are two
8 possibilities. There are things that I can compel. That would
9 be true of, for example, anything in the United States, but
10 that's not the issue here. There are things that I can
11 formally request like in Hague Convention applications and
12 stuff like that. And then there are things that I can less
13 formally request such as letters to relevant judges in foreign
14 countries and so forth.

15 All those seem to me to be at least worth thinking
16 about, but we'd need to act fairly quickly because the trial
17 date, by the way, is, as I'm sure I've said before, firm,
18 fixed, final, and unmoveable.

19 So okay, let's go back to the witness. Counsel was
20 putting some questions.

21 MR. CALIFANO: Thank you, your Honor.

22 BY MR. CALIFANO:

23 Q Dr. Edman, I think the last question I may have asked you --
24 and I just want to make sure that I've gotten this correctly --
25 is that, because you did not examine any of the input data that

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Edman - Cross

1 was put into the LP server to execute those transactions, you
2 were unable to determine who or what actually provided that
3 data; is that correct?

4 A Yes. Based on reviewing the LP server source code itself,
5 I can't say, you know, whether -- I can't say exactly what
6 application may have provided or called that REST API.

7 Q And I believe you stated in your deposition that to do so
8 would be speculation; is that right?

9 A I'm sorry. Could you be more specific? I don't remember
10 that context.

11 Q In your deposition, when you explained that you were unable
12 to determine who or what was providing information to the LP
13 server, you said that any venture to guess on that would be
14 speculation; is that right?

15 A You'd have to show me the transcript, but that's possible.
16 But the opinions in my report really relate to the -- whatever
17 actions the LP server source code takes on those inputs, what
18 it expects those inputs to be and the nature of the blockchain
19 transactions that that source code created on the Terra
20 blockchain.

21 MR. CALIFANO: I think in order to speed that up, I
22 can submit to the Court, your Honor, that citation if we need
23 to. I think we actually have --

24 THE COURT: No. I already have it.

25 MR. CALIFANO: Thank you.

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Edman - Cross

1 THE COURT: But it seems to me there were two
2 questions. One is a legal question, which is if an expert
3 would ideally have relied on certain information that, despite
4 the best efforts of everyone, is not available, does the fact
5 that it might be helpful mean that, nevertheless, his opinion
6 should be stricken? Or simply does it mean that his opinions
7 have to be taken in a more narrow context? And the second
8 question is whether really it matters as to the force of his
9 major opinion.

10 So those seem to me to be the questions raised by this
11 unfortunate lack of data. I don't know if you wanted to
12 comment on any of that, but if not, let's put another question.

13 Q Dr. Edman, you have no experience building, testing, or
14 operating financial payment systems; is that correct?

15 A If you're talking about, you know, like credit card payment
16 systems, things like that, no. Some of my professional work
17 was intersected with those sorts of systems before, in the
18 context of incident response, investigative analysis, source
19 code review. But, again, my opinions in this case relate to
20 analysis of source code that Terraform developed and Terra
21 blockchain transactions.

22 Q But you have never analyzed any payment systems to
23 determine where in those payment systems and at which point in
24 those payment systems a settlement is achieved, have you?

25 A In the context of blockchain-based payment systems, yes.

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Edman - Cross

1 Q Where did you offer an opinion about the settlement of
2 blockchain payment systems outside of this case?

3 A Well, I think the example that I gave during my deposition
4 was a case here in Southern District of New York involving a
5 platform called OpenSea, which is a marketplace where users can
6 buy and sell NFTs in exchange for crypto assets, and I examined
7 certain transactions and smart contract source code related to
8 processing the settlement of those transactions on that
9 decentralized marketplace.

10 Q But that doesn't relate to fiat payments, and it's not a
11 system like Chai that involves fiat payments; is that correct?

12 A Correct. That did not involve fiat payments, at least my
13 analysis in that case did not involve fiat payments.

14 Q And your opinion, Dr. Edman, is that in this case, the
15 transactions that are executed by the LP server on the
16 blockchain do not represent the processing and settlement of
17 Chai payment system transactions; is that correct?

18 A Correct. Because based on my analysis of the blockchain
19 transactions, there was no indication that there was actually a
20 transfer of value between users and merchants that occurred on
21 the Terra blockchain.

22 Q But you have not looked at a single element of the Chai
23 payment system, have you, in doing this analysis?

24 A I mean, if you consider the LP server to be part of the
25 Chai payment system, then I would say that I have. But again,

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Edman - Redirect

1 I haven't analyzed, you know, for example, how Chai accepted
2 credit card payments or interacted with fiat currency systems.

3 Q In fact, you testified that you did not know how Chai
4 operated; is that correct?

5 A Correct. Again, my analysis in this case and my opinions
6 relate to an analysis of source code in Terra blockchain
7 transactions.

8 Q So you have not analyzed any commercial payment systems
9 that use fiat, and in this case, you were unable to examine any
10 part of the Chai payment system other than the single component
11 that is identified as the LP server; is that correct?

12 A No, I don't believe that's correct. I gave an example
13 before of analysis that involved a traditional payment
14 provider, and my analysis in this case involved analysis of
15 more than just the LP server.

16 MR. CALIFANO: Your Honor, I think I can stop there.

17 THE COURT: Okay.

18 REDIRECT EXAMINATION

19 BY MR. CARNEY:

20 Q Dr. Edman, what did you review in connection with forming
21 your opinions in this case?

22 A I reviewed data from a variety of sources. This included
23 source code repositories for components developed by Terraform
24 Labs, including the LP server, an LP watcher application. I
25 reviewed internal communications, emails, chats involving the

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Edman - Redirect

1 developers of these systems. I reviewed information related to
2 a website called Chai Scan, which purported to track Chai
3 payment transactions, deposition transcripts, really a variety
4 of sources.

5 Q And is it normal in your line of work for someone to
6 review, for instance, communications between developers?

7 A Yes. In I would say pretty much every single
8 investigation, including blockchain-related investigations,
9 that involves, you know, not just analyzing and collecting
10 blockchain data, but also adding context to that data by
11 examining other sources.

12 Q And how is it that you can determine what the LP server did
13 in this case without the inputs that defense counsel referred
14 to?

15 A Well, the LP server is just source code and a fairly small
16 application at that. So I could analyze that source code. I
17 could look at what it expected the inputs to be, and I could
18 analyze what it would do with those inputs. It's a
19 deterministic system. So given certain inputs, you can analyze
20 the software and determine what the outputs are. In this case,
21 the outputs from the LP server are blockchain transactions
22 which are public, and so I was able to identify the properties
23 of those blockchain transactions based on reviewing the source
24 code associated with the LP server and then identifying those
25 transactions on the public Terra blockchain.

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Edman - Redirect

1 Q So just to be clear, did you need the inputs to identify LP
2 server blockchain transactions?

3 A No.

4 Q And did you do anything to verify your identification of LP
5 server blockchain transactions?

6 A I did. I reviewed some public posts that were made by Do
7 Kwon where he identified and pointed to screenshots of certain
8 transactions on the Terra blockchain and identified them as,
9 you know, purported Chai transactions. I compared those
10 transactions and the properties of those transactions to the
11 properties that I used in my methodology for identifying Chai
12 transactions on the Terra blockchain and confirmed that they
13 were consistent.

14 Q Okay. And based on your analysis, did the properties of LP
15 transactions on the Terra blockchain change over time?

16 A They did. At a high level, there were kind of two
17 different properties or different characteristics of blockchain
18 transactions generated by the LP server. Prior to
19 December 2019, the LP server source code, it appeared to ignore
20 a merchant ID that was one of the inputs, and it would just
21 create transactions from an address called the LP wallet. It's
22 two purported user wallets controlled by the LP server, and
23 then a matching transaction sending funds back to the LP
24 wallet. Post December 2019, it started to incorporate merchant
25 IDs into those transactions.

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Edman - Redirect

1 Q Okay. And just so we understand, if the inputs to the LP
2 server were not necessary for your analysis, do you have an
3 understanding as to why the SEC would have requested a copy of
4 the LP server?

5 A So the copy of the LP server is interesting, aside from
6 just the inputs, because it can provide a source of forensic
7 analysis. You can analyze this computer system and determine,
8 for example, who accessed this system, what they did while they
9 were on that system, commands that they had run. I identified
10 certain scripts that were developed alongside the LP server. I
11 don't provide an opinion in my report whether those were run,
12 but given access to the LP server itself, based on a forensic
13 analysis of that, you could determine whether and when and by
14 whom those scripts are run.

15 Q And did you analyze the source code associates with
16 additional scripts or programs in the LP server repository?

17 A I did.

18 Q And then, finally, in your report do you offer any opinions
19 regarding the state of mind or the intent of the developer or
20 the LP server?

21 A No. I quote in my report statements made by the developer,
22 but the opinions in my report are really based on analysis of
23 blockchain transactions, other data produced in this case, as
24 well as my analysis of what the LP server source code did.

25 MR. CARNEY: Thank you.

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1 THE COURT: All right. Thank you very much. You may
2 step down.

3 MR. CARNEY: Thank you, your Honor.

4 (Witness excused)

5 THE COURT: So while I know both sides would like to
6 make additional points and offer additional arguments, running
7 at least till midnight, I think I will forego that benefit.
8 But I will get you, as I say, a bottom line order. There will
9 be a full opinion, but that I'm sure will not be ready by
10 Thanksgiving, but a bottom line will be, so you'll have the
11 bottom line.

12 And I do want to go back to a small issue, but I think
13 it's one we maybe should get a little briefing on, which is
14 should it be left to the jury to determine, on an appropriate
15 charge, whether these are or are not securities? Or should it
16 be left to the jury to make factual determinations of each of
17 the elements that would be part, for example, of a Howey test,
18 but still then based on the jury's determination of those
19 factual elements, leave it to the Court to determine whether
20 they meet the requirements of Howey or not?

21 So there was mention made of one case that went the
22 first way, and that may be the right way. I don't have a
23 preconception on this issue, but I think we need to resolve it.
24 Because, of course, the case may get resolved on summary
25 judgment, but barring that, this is an issue obviously we'll

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1 have to confront before we get to the jury because we're not
2 going to have time during the course of the jury trial to deal
3 with it.

4 So I'll ask both sides. I don't think we need a back
5 and forth in all this. This is just to give me a head start,
6 so give me your views on that issue in letter briefs to be
7 submitted no later than December 2. I would imagine would be
8 maybe no more than about five single-spaced pages.

9 All right. Anything else we need to take up today?

10 MR. CARNEY: Your Honor, I would just note for the
11 record that today was the date that your Honor had set as the,
12 trial-ready date and I don't know if --

13 THE COURT: Oh, no. No. That has been superseded
14 by the fixed, final, unalterable trial date of January 29, I
15 think it is.

16 MR. CONNOR: Your Honor, the one other issue we wanted
17 to raise is, just in terms of planning for trial, we have not
18 heard yet from the defendants whether they expect the defendant
19 Do Kwon to appear in trial. And we've asked defendants whether
20 they intend to waive his right to appear at trial, and we
21 haven't heard an answer on that. And we were hoping for an
22 answer by today, which previously was the trial-ready date. So
23 we would just request that defendants inform us of their
24 position on that.

25 THE COURT: Okay. Dense counsel, want to comment on

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1 that?

2 MR. HENKIN: Your Honor, at this point, we're unable
3 to address that for the reasons that we've discussed with the
4 SEC previously. When we are able to, when we have information,
5 we will, of course, provide it, but we just don't know yet.

6 THE COURT: Okay. Well, I think that's got to be
7 resolved certainly by end of December. I don't think we can
8 leave it until right before the start of trial.

9 MR. HENKIN: Agreed, your Honor.

10 By the way, one thing I just wanted to note, one of my
11 colleagues informed me that December 2 is a Saturday. I don't
12 know if that's what your Honor intended.

13 THE COURT: No. Well, that's an added advantage, of
14 course, but yes, I was looking at a 2022 calendar. So you are
15 absolutely right. So in taking merciful advantage of that,
16 I'll give you till December 4.

17 Okay. Anything else we need to take up today?

18 MR. HENKIN: No. Thank you, your Honor.

19 I would just say that we believe that the issues
20 raised by the expert reports, particularly of Doctors Mizrach
21 and Edman are critical to two of the very specific fraud
22 claims, and so we would urge your Honor to very strictly apply
23 *Amorgianos* and the 702 factors.

24 THE COURT: Yes. By the way, I should mention I was
25 invited – I think the fair term is coerced – into participating

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1 at a conference on issues in securities law at Columbia Law
2 School in December. Professor Jack Coffey, with whom I've been
3 teaching a course in white collar crime for 34 years, basically
4 let it be known that if I didn't say yes, he would never speak
5 to me again, which was, of course, made it a close call. But
6 in any event, I accepted on the strict condition that obviously
7 I would say nothing about this case, even indirectly.

8 So what they have me doing in that is sort of giving
9 the history of *Howey* and with sort of the basic law that you
10 both have all agreed on in your papers and all like that. But
11 I just wanted to let you know because if anybody has any
12 objections to my doing that, I might be tempted to take you up
13 on it. Anyway, so that will be sometime in December.

14 Okay. Very good. Thanks so much.

15 (Adjourned)

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